

REMARKS

Claims 68, 70-75, 77, 79-80, 83-84 and 87-96 are cancelled. Claims 76 and 81 are amended. Claims 97 and 98 which were newly presented in the Response After Final, but which were not entered into the application, are re-presented as new claims 97 and 98. Claims 76, 81 and 97-98 are pending in the application.

Claims 76, 77, 79-81, 83 and 84 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor had possession of the claimed invention at the time the application was filed. The Examiner states that the recited term "being essentially free of nitrogen" is not supported by the specification. Without admission as to the propriety of the Examiner's rejection, claim 76 has been amended to remove the term "being essentially free of nitrogen". Accordingly, applicant respectfully requests withdrawal of the § 112 rejection of claim 76 and claims which depend therefrom in the Examiner's next action.

Independent claims 68 and 87 and each of corresponding dependent claims 70-75 and 88-94 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over various cited combinations of applicant's admitted prior art (AAPA), Spuler (U.S. Patent No. 5,935,873), Nobuhisa (JP 10-223758), McAnally (U.S. Patent No. 6,136,700) and Wolf, Silicon Processing for the VLSI Era, Vol. 2; Process Integration, (1990), pp. 354-355. Without admission as to the propriety of the Examiner's rejection claims 68, 70-75 and 87-94 are cancelled.

Independent claim 76 and corresponding dependent claims 77, 79-81 and 83-84 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over various cited

combinations of AAPA, Spuler, Wolf, McAnally and Nobuhisa. The Examiner is reminded by direction to MPEP § 2143 that a proper obviousness rejection has the following three requirements: 1) there must be some suggestion or motivation to modify or combine reference teachings; 2) there must be a reasonable expectation of success; and 3) the combined references must teach or suggest all of the claim limitations. Claim 76 and its pending dependent claims are allowable over the various cited combinations of AAPA, Spuler, Nobuhisa, Wolf and McAnally for at least the reason that the references, individually or as combined, fail to disclose or suggest each and every limitation in any of those claims.

As amended independent claim 76 recites carbon-containing sidewall spacers extending along sidewall edges of wordlines, the carbon-containing sidewall spacers consisting essentially of silicon, oxygen and from about 2% to about 20% carbon, by weight. Claim 76 further recites an insulative layer in contact with at least one of the carbon-comprising sidewall spacers and a bit line contact, a first storage node and a second storage node each in physical contact with one or more of the carbon-containing sidewall spacers. The amendment to claim 76 is supported by the specification at, for example, page 20, lines 13-22; page 21, line 1 through page 22, line 6; and Fig. 9. AAPA does not disclose or suggest the claim 76 recited carbon-containing sidewall spacers consisting essentially of silicon, oxygen and from about 2% to about 20% carbon. Additionally, AAPA fails to disclose or suggest the claim 76 recited insulative layer in contact with at least one carbon-comprising sidewall spacer and fails to disclose or suggest the claim 76 recited bit line contact in physical contact with one or more of the carbon-containing sidewall spacers, the recited first storage node in physical contact with one or

more carbon-containing sidewall spacers and the recited second storage node in physical contact with one or more of the carbon-containing sidewall spacers.

Spuler discloses incorporation of carbon into a silicon-nitride layer 22 (col. 2, ll. 49-55) and formation of an oxide layer 30 over the carbonized nitride layer (col. 3, ll. 23-25). Spuler does not disclose or suggest the claim 76 recited carbon-containing sidewall spacers consisting essentially of silicon, oxygen and from about 2% to about 20% carbon, by weight. Further, Spuler fails to disclose or suggest the claim 76 recited insulative layer in contact with at least one carbon-comprising sidewall spacer consisting essentially of silicon, oxygen and from about 2% to about 20% carbon, by weight. Spuler additionally fails to disclose or suggest the claim 76 recited first storage node in physical contact with one or more carbon-containing sidewall spacers, a second storage node in physical contact with one or more of the carbon-comprising sidewall spacers and a bit line contact in physical contact with one or more carbon-containing sidewall spacers.

Wolf is cited to show formation of oxide sidewall spacers. Wolf does not disclose or suggest the claim 76 recited carbon-containing sidewall spacers consisting essentially of silicon-oxygen and from about 2% to about 20% carbon, by weight. Additionally, Wolf fails to disclose or suggest the claim 76 recited insulative layer in contact with at least one carbon-comprising sidewall spacer consisting essentially of silicon-oxygen and from about 2% to about 20% carbon, by weight. Additionally, Wolf fails to disclose or suggest the claim 76 recited bit line contact in physical contact with one or more carbon-containing sidewall spacers, the recited first storage node in physical contact with one or more carbon-containing sidewall spacers and the recited second storage node in physical contact with one or more carbon-containing sidewall spacers.

Nobuhisa discloses incorporating nitrogen or nitrogen and carbon into a layer to form a difficulty etching layer over an oxide layer (paragraphs 37-38 and 53). Nobuhisa does not disclose or suggest the claim 76 recited carbon-containing sidewall spacers consisting essentially of silicon-oxygen and from about 2% to about 20% carbon, by weight. Additionally, Nobuhisa fails to disclose or suggest the claim 76 recited insulative layer in contact with at least one carbon-comprising sidewall spacer. Further, Nobuhisa does not disclose or suggest the recited bit line contact in physical contact with one or more carbon-containing sidewall spacers, the recited first storage node in physical contact with one or more carbon-containing sidewall spacers, or the recited second storage node in physical contact with one or more carbon-containing sidewall spacers, the sidewall spacers consisting essentially of silicon, oxygen and from about 2% to about 20% carbon, by weight.

McAnally discloses sidewall spacers 108 which can comprise carbon-rich nitride or carbon-rich oxide wherein "carbon-rich" is defined as comprising "some carbon" (abstract, col. 5, ll. 9-17 and col. 6, ll. 25-34). McAnally does not disclose or suggest the claim 76 recited carbon-containing sidewall spacers consisting essentially of silicon-oxygen and from about 2% to about 20% carbon by weight. Further, McAnally fails to disclose or suggest the claim 76 recited insulative layer in contact with at least one carbon-comprising sidewall spacer consisting essentially of silicon, oxygen and from about 2% to about 20% carbon, by weight. Further, McAnally fails to disclose or suggest the claim 76 recited bit line contact in physical contact with one or more carbon-containing sidewall spacers, a first storage node in physical contact with one or more carbon-containing sidewall spacers and a second storage node in physical contact with one or more carbon-containing sidewall

spacers, the carbon-containing sidewall spacers consisting essentially of silicon-oxygen and from about 2% to about 20% carbon, by weight.

Not one of the references cited by the Examiner disclose or suggest the claim 76 recited carbon-containing sidewall spacers extending along sidewall edges of wordlines, the carbon-containing sidewall spacers consisting essentially of silicon, oxygen and from about 2% to about 20% carbon, by weight. Additionally, not one of the cited references discloses or suggests the recited insulative layer in contact with at least one carbon-comprising sidewall spacer which consists essentially of silicon, oxygen and from about 2% to about 20% carbon, by weight. Further, not one of the cited references disclose or suggest the recited bit line contact in physical contact with one or more carbon-containing sidewall spacers, a first storage node in physical contact with one or more carbon-containing sidewall spacers and a second storage node in physical contact with one or more carbon-containing sidewall spacers, the sidewall spacers consisting essentially of silicon, carbon and from about 2% to about 20% carbon, by weight. Accordingly, the references cannot be combined to suggest the recited combination of features and claim 76 is not rendered obvious by the cited combinations and is allowable over these references.

Dependent claims 77-80 are cancelled. Dependent claim 81 is amended to properly depend from independent claim 76. Claim 81 is allowable for at least the reason that it depends from allowable base claim 76.

Claims 97 and 98 do not add “new matter” to the application since each is fully supported by the specification as originally filed. Claims 97 and 98 are supported by the specification at, for example, page 22, line 16 through page 23, line 2; page 21, lines 1-3

and the claims as originally filed. New claims 97 and 98 are allowable for at least the reason that they depend from allowable base claim 76.

For the reasons discussed above, claims 76, 81 and 97-98 are allowable. Accordingly, applicant respectfully requests formal allowance of pending claims 76, 81 and 97-98.

The present Response to the Advisory Action and Request for Continued Examination is being filed within the three month period for reply pertaining to the Final Action dated December 16, 2003. Accordingly, no extension fee is due.

Respectfully submitted,

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